CRANBERRY TISSUE TESTING

The only reliable means of assessing the efficacy of a fertilizer program is tissue testing. The correct time to collect tissue and soil samples for analysis is late August through early September. Cranberries require proper amounts of 13 mineral elements in addition to carbon dioxide, water and sunlight. When any of these items are in short supply growth and yield will be reduced. However, if they are in adequate supply, adding additional amounts will not increase growth or yields. Tissue testing is the single reliable means of determining if adequate amounts of the 13 required mineral elements have been supplied and to gauge if your fertility program has been effective.

Good tissue testing requires consideration of three factors:

- Sample at the correct time
- Sample the correct part
- Normal nutrient ranges

Taking a sample

Collect tissue samples during the last two weeks of August through the first week or two of September. The reason to take samples during this time is that the concentrations of the 13 required minerals are stable during this period so the exact date you take the sample is less critical. Also, the standard values against which the results are compared are based on sampling in this time frame. Samples taken at other times are not interpretable based on these standards.

Sample the correct plant part

A good cranberry sample consists of current season growth from both fruiting and non-fruiting uprights. Clip the uprights just above the fruit and be sure to get only current season growth. Collect about 20 tips from about 10 different locations within a bed. Don't collect all the samples from one corner or along one edge. Walk a zigzag pattern throughout the bed, or walk from one corner to the opposite corner collecting samples along the way. Collect from about 10 separate locations within a bed. The total sample will consist of about 200 uprights or about 1 to 1 ½ cups of tissue.

Do not wash or rinse the uprights. Washing will remove soluble nutrients and give you an inaccurate test. Allow the sample to dry overnight before mailing. Use paper bags or envelopes to mail the samples. Please don't use plastic bags. Be sure to label each bag or envelope with a bed number or other identification code. Submit the samples promptly to a reputable laboratory. Your county Extension office can help you locate a suitable lab. If the lab is ASCS certified you can be sure of reliable results and may be eligible for cost sharing.

Soil Testing

Take a soil test at the same time you collect tissue samples. Use a trowel or soil probe to sample to six inches. Collect the soil samples in the same area where you collected tissue samples. The UWEX lab will run a routine soil test accompanying a tissue test at no additional fee ($18.00).

Interpreting the results

Once the results come back from the lab you should compare the results against the nutrients standards for North America and against previous results for the bed or section.

In addition to the lab results you should pay attention to vine growth. Vigorous growth or weak growth may be explained by your test results and will help you alter your fertility program for the following year.

The report will **not** tell you how much fertilizer to apply next season, but will allow you to monitor the efficacy of your current program and point out potential concerns to watch out for later. If you plot the results of tissue testing over time you can begin to see patterns of nutrient changes over time and work to prevent deficiencies.

Table 1. Cranberry tissue standards for producing beds in North America

Nutrient	Normal Concentration[1]
Nitrogen (N)	0.90-1-10%
Phosphorus (P)	0.10-0.20%
Potassium (K)	0.40-0.75%
Calcium (Ca)	0.30-0.80%
Magnesium (Mg)	0.15-0.25%
Sulfur (S)	0.08-0.25%
Boron (B)	15-60 ppm
Iron (Fe)[2]	>20 ppm
Manganese (Mn)[2]	>10 ppm
Zinc (Zn)	15-30 ppm
Copper	4-10 ppm

1. *Normal levels are based on samples taken between August 15 and Sept. 15.*
2. *Cranberry researchers have not found a normal range for Fe and Mn.*

More information about tissue sampling is found in the bulletin A3642 “Cranberry tissue testing for producing beds in North America”. Copies are available at your county Extension office or via the web:
http://www.hort.wisc.edu/cran/Publications/a3642.pdf

Teryl Roper, UW-Madison Extension Horticulturist

REPORTING ORBIT USE

The Section 18 exemption for the fungicide ORBIT (propiconazole) expired on July 31 and now is the time to report use of this product in Wisconsin. All cranberry growers in Wisconsin will soon receive a form to record their use of Orbit. If you used ORBIT, you MUST provide the information requested on the form and return it to me no later than September 6, 2002. Reporting ORBIT use is required by the EPA, and future Section 18 or regular labels for ORBIT will not happen unless we provide them with these data.

If you have questions about reporting fungicide use, call me at 608-265-2041, or e-mail me at psm@plantpath.wisc.edu.

Patty McManus, UW-Madison Extension Plant Pathologist

Acquaintance, *n.* A person whom we know well enough to borrow from, but not well enough to lend to. A degree of friendship called slight when its object is poor or obscure, and intimate when he is rich or famous.
Alliance, *n.* In international politics, the union of two thieves who have their hands so deeply inserted in each other’s pocket that they separately cannot plunder a third.

Ambrose Bierce

FRUIT GROWTH

This time of year cranberry growers are very interested in getting their fruit to size. This year in particular fruit size is smaller than growers hope. The question inevitably arises, “What can I do to get these small fruit to size?” The answer, unfortunately, is that there is likely nothing you can do as a management practice to cause small fruit to get bigger between now and harvest. Fruit are composed of water, organic compounds and some few mineral elements. Let’s discuss these components.

Most fruit are about 85% water. Water is important for a variety of reasons. Adequate water allows the stomates in the leaves to be open, thus facilitating carbon dioxide entering the leaves and oxygen and water to leave the leaves. Water is the driving force for carrying minerals to the leaves and fruit. Water causes cells to expand, leading to larger fruit. Most growers have had more than enough water this year, nor have we had significant stretches of hot dry weather that would cause water deficits. In general cranberries require at most an inch of water per week to meet their demands.

The structure of plants is about 95% carbon, hydrogen and oxygen. These are materials like cellulose, lignin, proteins and lipids. Photosynthesis is the origin for all of the carbon contained in these compounds. The amount of carbon that can be fixed through photosynthesis is important to ultimate crop yields. Provided there is enough water and carbon dioxide, light and temperature are the primary limiting factors to cranberry photosynthesis. It takes about half of full sunlight to achieve the maximum mid-day rate of photosynthesis. Light clouds or haze should not reduce photosynthesis. However, heavy clouds will block sufficient light to substantially reduce photosynthesis.

Even with good rates of photosynthesis our calculations predict that, on average, a fruiting upright fixes enough carbon to support the growth of two fruit per upright. (see 1993 Wisconsin Cranberry IPM Newsletter 7(8):1-2)

The optimal temperature for cranberry photosynthesis is about 75°F. At temperatures higher or lower than this the rate of photosynthesis declines. One recent study showed that for the five cranberry producing states the best predictors of fruit growth rates were neither degree days nor simply the number of days. Rather, it was the number of moderate temperature days with lows above 60°F and highs below 86°F. 1992 was a cool year in Wisconsin with many more nights below 60° than 1993. It took 11 more days in 1992 for a fruit to gain one-half gram of weight than in 1993. Unfortunately, we have no control over the weather.

The last component of fruit is minerals. Minerals are required above certain concentrations for plants to grow and fruit to develop. Once the concentrations are at or slightly above these levels adding more won’t improve plant performance. Consider your fertility program like putting gas in your truck. When the tank is empty the truck won’t run. But when the tank is full the truck won’t run farther or faster by putting the nozzle through the window and filling up the cab! Once your plants have adequate fertility you won’t make any more fruit set or get any larger than they would have gotten anyway by adding more fertilizer. In fact, the nitrogen fertilizer you apply this year has little, if any, effect on this year’s crop (see Wisconsin Cranberry School proceedings 1994, 5:18-21) even on a bed diagnosed as deficient.

What is the point of this rambling? First, fruit growth is largely controlled by the weather. We have no control over the weather so we have to be satisfied with doing the best we can given our conditions. Second, adding fertilizer this year will not cause fruit to be larger or more fruit to set this year. Good overall management will provide the best chance of salvaging a crop this year. There are no magic potions that will change this.

Teryl Roper, UW-Madison, Extension Horticulturist

CRANBERRY FIELD DAY

The 2002 Wisconsin Cranberry Field Day will be held Wednesday August 14 at Tamarack Flowage Cranberry Company near Three Lakes. Registration materials will be sent by the Wisconsin State Cranberry Growers Association.

This is a beautiful, well maintained property. I’m confident there will be something for you to learn at this field day. Please put this date on your calendar and plan to attend.